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ABSTRACT

The course outline will serve as a guide to the 11th grade student interested in sheet metal occupations. The course, 135 hours in length, covers the basic techniques of cutting and trimming, drilling and hole preparation of metals. Lecture and demonstration techniques are to be utilized, with emphasis on the use of visual aids, mock-ups, cut-aways, transparencies, color slides, films, and manipulative shop practice. A bibliography lists references, manuals, and other instructional materials. A posttest sample concludes the course description. (MW)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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Course Outline
SHEET METAL WORK 2 - 9855
(Aircrait Assembly, Riveting and Surface Repair I)
Department 48 - Quin 9855.02

CE 002 215

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1973

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1 4 5 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

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SHEET METAL WORK 2 - 9855
(Aircraft Assembly, Riveting and Surface Repair I)

Department 48 - Ouin 9855.02

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VOCATIONAL AND ADULT EDUCATION

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Dade County Public Schools
Miami, Florida 33132

April, 1973

Published by the School Board of Dade County

Course Description

9855	48	9855.02	Aircraft Assembly, Riveting and Surface Repair I
State Category Number	County Dept. Number	County Course Number	Course Title

This quin course covers the basic techniques of cutting and trimming, drilling and hole preparation of metals. This is a three quinmester credit course. Prior

Indicators of Success: Prior to entry into this course the student must display mastery of the skills indicated in 9855.01

Clock Hours: 135

PREFACE

The following quinmester course outline will serve as a guide to the high school student who wishes to persue the field of sheet metal work. This is the second course for the eleventh grade.

This course outline consists of five blocks of instructions which are subdivided into several units each. The course is 135 hours in length.

In presenting the materials outlined in this course, the instructor uses the lecture and demonstration methods with emphasis on the use of visual aids, mock-ups, cut-aways, transparencies, color slides, films and manipulative shop practice.

Prior to entry into this course the student must display mastery of the skills indicated in Quin 9855.02.

No basic textbook is required for the course, however, the bibliography which appears on the last pages of the outline lists the reference books, manuals, and other materials that are used throughout the course.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

TABLE OF CONTENTS
with Suggested Hourly Breakdown

	Page
PREFACE	i
GOALS	iii
SPECIFIC BLOCK OBJECTIVES	iv
BIBLIOGRAPHY	3
BLOCK	
I. CUTTING (30 Hours)	
Cutting Tools	1
Cutting Equipment	1
Methods of Cutting	1
II. DRILLING (30 Hours)	
Drilling Tools	1
Drilling Procedures	1
Holes	1
III. RIVETING (45 Hours)	
Installing Conventional Rivets	1
Riveting Aircraft Section	2
Installing Temporary Fasteners	2
IV. SURFACE (30 Hours)	
Type of Surface	2
Repairs to Surface	2
V. QUINMESTER POST TEST	
APPENDIX: QUINMESTER POST TEST SAMPLE	6

GOALS

The student must be able to demonstrate:

1. An ability to recognize aviation sheet metal tools and machines and their proper use.
2. The ability to safely and properly handle aircraft sheet metal equipment.
3. Techniques used in riveting methods.
4. Techniques used in fabrication methods.
5. Recognition of the type of metals of which aircraft are made.
6. Ability to drill and cut sheet metal.
7. Techniques used in surface repairs.
8. The ability to become proficient in all phases of riveting.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - CUTTING

The student must be able to:

1. Demonstrate the proper use of cutting tools.
2. Exhibit the ability to use cutting equipment.
3. Explain proper methods of sheet metal cutting.

BLOCK II - DRILLING

The student must be able to:

1. Demonstrate the proper use of drilling tools.
2. Explain drilling procedure.
3. Exhibit the ability to drill and calculate proper hole sizes.

BLOCK III - RIVETING

The student must be able to:

1. Demonstrate the proper installation of conventional rivets.
2. Exhibit the ability to properly rivet aircraft sections.
3. State the reasons for installing temporary aircraft fasteners.

BLOCK IV - SURFACE

The student must be able to:

1. List the types of surfaces.
2. Exhibit the ability to properly do repairs on metal surface.

BLOCK V - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

SHEET METAL WORK 2 - 9855
(Aircraft Assembly, Riveting and Surface Repair I)

Department 48 - Quin 9855.02

I. CUTTING

A. Cutting Tools
1. Hacksaws
2. Twist drills
3. Countersinks and lightening hole dies
4. Snips
5. Rotary files

B. Cutting Equipment
1. Squaring shears
2. Throatless shears
3. Hand bench shears
4. Unishear

C. Methods of Cutting
1. Machine
2. Manual

II. DRILLING

A. Drilling Procedure
1. Hand drilling tools
2. Pneumatic drilling tools
3. Drill bits
4. Special attachments

B. Drilling Procedure
1. Selecting proper drill bits
2. Techniques of drilling on the drill press
3. Techniques of drilling with hand and power tools

C. Holes
1. Drilling holes for rivets
2. Buffing drilled holes
3. Selecting proper tools for drilling holes
4. Measurement of holes
5. Reaming techniques
6. Limitation on enlargement of holes

III. RIVETING

A. Installing Conventional Rivets
1. Identify conventional aircraft rivets
2. Perform riveting to specification

3. Identify, remove and replace improperly installed rivets

B. Riveting Aircraft Section
   1. Riveting structual parts
   2. Riveting nonstructual part

C. Installing Temporary Fasteners
   1. Type of temporary fasteners
   2. Precautions when using temporary fastener
   3. Removal and installation procedure

IV. SURFACE

A. Type of Surface
   1. Primary surface
   2. Secondary
   3. Plastic
   4. Fiberglass
   5. Metal

B. Repairs to Surface
   1. Cracks
   2. Loose rivets
   3. Scratches
   4. Abrasions
   5. Dents
   6. Cuts
   7. Corrosion
   8. Breaks
   9. Warping

V. QUINMESTER POST-TEST

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Basic Reference:

None

Supplementary References:

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5. How To Rivet Aluminum. 16 mm. 20 min. B/W. 1942. Alcoa.

A P P E N D I X

Quinmester Post-Test Sample

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QUINMESTER POST-TEST

Name _____ Date _____ Score ____

Multiple Choice Test Items

Each statement needs a word, a figure, or a phrase to make it correct. Only one of the choices listed is correct. Place the number of the choice you make in the space provided at the right edge of the sheet.

---

1. Why are cutting tools dipped into water very often when sharpening by grinding? (1) Remove every dust to prevent oxidation, (2) to cool and preserve temper, (3) reduce danger of shattering the grinding wheel, (4) prevent spontaneous combustion and reduce danger of splitting. ( )

2. Which of the following does not represent a type of file? (1) Vixen, (2) Bastard, (3) Briggs, (4) Mill ( )

3. Transparent plastic sheet (such as plexiglass) should best be cut with (1) saw, (2) pneumatic nibbler, (3) tin snips, (4) thin chisels. ( )

4. A hack saw blade for cutting thin wall tubing should have (1) 10 teeth per inch, (2) 20 teeth per inch, (3) 32 teeth per inch, (4) 12 teeth per inch. ( )

5. Cutting oil is used for (1) lubricating and cooling when drilling metal, (2) lubricating and cooling when drilling wood, (3) cutting heavy grease, (4) reducing paint. ( )

6. For general work, the tip of a drill should be ground to (1) 45°, (2) 100°, (3) 75°, (4) 59°. ( )

7. Holes for rivets are drilled (1) same as shank diameter, (2) approximately .010" oversize, (3) approximately .010" undersize, (4) approximately .005" oversize. ( )

8. The drill size required for drilling holes for 1/8 inch rivet is (1) No. 12, (2) No. 21, (3) No. 30, (4) No. 40. ( )

9. The best method for removing imperfect rivets is (1) chisel under shank, (2) drill to 1/16 inch oversize, (3) grind off shank and punch out rivet, (4) drill head and punch out rivet. ( )

10. To remove a rivet, a mechanic should use a drill which is (1) slightly smaller than the rivet head, (2) same size as the rivet shank, (3) slightly larger than the rivet shank, (4) slightly smaller than the rivet shank. ( )

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11. The equipment for cutting which is called a power-operated combination snips is (1) hand bench shear, (2) throatless shear, (3) unishear, (4) squaring shear. ( )

12. Right hand aviation snips cuts to the (1) left, (2) right, (3) center, (4) side. ( )

13. Twist drills are provided with (1) letters, (2) numerals, (3) fractions, (4) all of the above. ( )

14. The type of cutting equipment to be used depends primarily upon (1) length of the material, (2) type and thickness of the material, (3) type and shape of the material, (4) all of the above. ( )

15. Places where a straight drill is impossible to insert you should use for drilling (1) a fly cutter, (2) a larger extension drill, (3) an angle attachment or flexible shaft drill, (4) cutting discs. ( )

16. How can burrs around the outside of a hole be removed quickly and easily? (1) With a file, (2) With a rivet cutter, (3) With an oversized drill, (4) With a countersink reamer ( )

17. A large percentage of elongation indicates that a metal is (1) ductile, (2) brittle, (3) strain-hardened, (4) heat treated. ( )

18. When rivets of the proper length are not available, it is customary to use (1) a larger diameter rivet of proper length, (2) a shorter rivet, (3) a longer rivet, (4) a longer rivet cut to the right length. ( )

19. Finishing the surface of material by friction with a revolving, polished, steel, member is called (1) roughing, (2) burnishing, (3) burring, (4) beading. ( )

20. A smooth flat machined surface surrounding a hole is called a (1) counterbore, (2) fillet, (3) spotface, (4) countersink. ( )

21. When drilling holes for rivets in sheet metal repairs, the holes should be spaced from each other at least (1) three times the diameter of rivet shank, (2) one inch, (3) two times the length of rivet, (4) .75 inch. ( )

22. Small holes and dents in the surface of metal covered aircraft should be repaired by (1) welding, (2) riveting a small patch, (3) replacing panel completely, (4) applying angle stiffener on underside. ( )

23. The marks on a rivet head denote (1) the manufacturer of the rivet, (2) the composition of the rivet, (3) the diameter and length of the rivet, (4) all of the above. ( )

24. Special riveting practices and techniques for a particular airplane can best be obtained from (1) the aircraft specifications, (2) the owner's operational handbook, (3) service bulletins, (4) the manufacturer's service manual. ( )

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25. Small scratches on the surface of sheet metal are detrimental primarily because (1) fatigue failure of the metal may easily develop from the minor scratches, (2) the poor aerodynamic surface that results, (3) the surface will never be suitable for proper bonding of paint, (4) the scratches prevent a smooth lap between two sheets of the metal. ( )

26. The A-N designation of a universal head rivet is (1) 430, (2) 455, (3) 470, (4) 426. ( )

27. What is "blind riveting?" (1) Upsetting rivets without bucking, (2) Securing rivets by using special bolts, (3) Riveting with headless rivets, (4) Riveting where the driver and bucker cannot see each other. ( )

28. The extended length of a rivet is (1) the overall length of a flush rivet, (2) the rivet length minus thickness of metal, (3) the rivet length plus thickness of metal, (4) all of the above. ( )

29. Metal skin repair patches may be divided into how many general types (1) four, (2) three, (3) six, (4) two. ( )

30. Where aerodynamic smoothness is not important, you may install what type of metal patch? (1) flush, (2) oval, (3) lap, (4) butt. ( )

ANSWER KEY TO QUINMESTER POST-TEST

1. (2)
2. (3)
3. (1)
4. (3)
5. (1)
6. (4)
7. (4)
8. (3)
9. (4)
10. (2)
11. (3)
12. (1)
13. (4)
14. (2)
15. (3)
16. (3)
17. (1)
18. (3)
19. (2)
20. (3)
21. (1)
22. (2)
23. (2)
24. (3)
25. (1)
26. (3)
27. (1)
28. (2)
29. (3)
30. (3)